NOAA FISHERIES
NATIONAL MARINE FISHERIES SERVICE

Authorizations and Permits for Protected Species (APPS)

File #: 1339-3R
Title: Study to assess adult and juvenile steelhead

Applicant Information

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Project Information

File Number: 1339-3R

Application Status: **Application Complete**

Project Title: Study to assess adult and juvenile steelhead status in tributaries of the Imnaha, Grande Ronde, and Clearwater River basins

Project Status: Renewal

Previous Federal or State Permit: 1339-2R

Permit Requested:
- ESA Section 10(a)(1)(A) permit (Pacific fish)

Where will activities occur?
Idaho
Oregon (including Columbia River and offshore waters)
Washington (including Columbia River and offshore waters)

State department of fish and game/wildlife: N/A

Research Timeframe: **Start:** 03/26/2012 **End:** 12/31/2016

Sampling Season/Project Duration: The application is covering two major activities performed by the Nez Perce Tribe Department of Fisheries Resources Management within three states, those activities are adult steelhead trapping using weirs, and juvenile trapping using rotary screw traps.

Adult weirs will be operated from Nov/Dec to March/April of each year. Juvenile screw trapping will occur year round exept for times of ice out and high flow conditions.

Ongoing work in the Imnaha Subbasin has occurred since 2000 in Cow, Lightning, Horse, and Camp creeks, with planned expansion into other upper Imnaha Creeks starting in 2011.

New work in the Snake, Clearwater and Grande Ronde Subbasins scheduled for 2011 and beyond.

Duration of these projects will be determined by ongoing funding, however these projects are planned to continiue into the forseeable future.

Abstract: The Nez Perce Tribe under the authorization of the Columbia River Intertribal Fish Commission is authorized to annually take adult and juvenile, threatened, SR spr/sum Chinook salmon and threatened, SR steelhead while conducting research in a number of the tributaries to the Imnaha (Cow, Lightning, Horse, Big Sheep, Camp, Little Sheep, Freezeout, Grouse, Crazyman, Mahogany, and Gumboot Creeks) and Grande Ronde River (Joseph Creek, Wenaha and Minam rivers) basins in Oregon/Washington, Clearwater River (South Fork Clearwater River and Lolo Creek) Basin in Idaho, and Snake River (Lower Granite Dam adult trap) in Washington. The purpose of the research is to acquire information on the status (escapement abundance, genetic structure, life history traits) of juvenile and adult steelhead in the Imnaha, Grande Ronde, and Clearwater River basins. The research will benefit the listed species by providing information on current status that fishery managers can use to determine if recovery actions are helping increase wild Snake River salmonid populations. Baseline information on steelhead populations in the Imnaha, Grande Ronde, and Clearwater River basins will also be used to help guide future management actions. Adult and juvenile salmon and steelhead will be observed, harassed, handled, and marked during the use of temporary/portable picket and resistance board weirs, and rotary screw traps, and sampled for biological information. Biological samples will include fin tissue and scale samples. Marks will include; opercuea punches, fin clips, application of dyes, and PIT, floy, and/or Tyvek disk tags. Adult steelhead carcasses will also be collected and sampled for tissues and/or scales and biological information. This project does not intend to intentional kill any of the fish being captured but a small number may die as an unintended result of the activities.

Project Description

Purpose: Snake River basin steelhead are currently listed as a threatened species under the Endangered Species Act. Limited information is available on the status (escapement abundance, genetic structure, and life history traits) of steelhead in the Snake River basin, making development of fisheries conservation or management actions problematic. Ideally, baseline information on abundance, spatial structure, and diversity should be assessed in all spawning aggregates. Specifically related to ongoing fisheries management actions is a lack of data on the dispersion of adult hatchery reared steelhead into streams in the Imnaha, Grande Ronde and Clearwater rivers from the Lower Snake River Compensation Plan (LSRCP) steelhead supplementation efforts. A more comprehensive study of adult and juvenile steelhead escapement and genetic structure in the Imnaha, Grande Ronde, and Clearwater River subbasins are needed. The proposed approach using temporary/portable picket/resistance board weirs and rotary screw traps would provide information on adult and juvenile steelhead escapement (number, timing, distribution, spawner age composition, length-age relationships and hatchery/wild composition, and juvenile and adult survival) and genetic profile in up to numerous streams in the Imnaha, Grande Ronde, and Clearwater River subbasins.

Data generated through the implementation of this project is required under the FCRPS BiOp (RPAs 50.5, 50.6, 63.1, 71, 71.2, and 72) and is consistent with the Coordinated Anadromous Workshop Snake Basin strategy for high precision abundance data, hatchery effectiveness monitoring, and data management answers questions 1,4,5,6,7,9 of the NPCC Programmatic Management Questions (MERR/FWP Management Questions).
This application is requesting ESA coverage for activities from five separate Nez Perce Tribe Projects:
1. 199703000 - Chinook Salmon Adult Abundance Monitoring (Includes Fast Track Joseph Creek Steelhead Escapement Monitoring project)
2. 201003200 - Adult Steelhead Escapement Monitoring - Imnaha River Subbasin
3. 201005700 - B-run Steelhead Supplementation Monitoring Project, Clearwater Basin
4. 199800702 – Grande Ronde Evaluation Studies, Grande Ronde Basin
5. Lower Snake River Compensation Plan Hatchery Evaluation Studies, Imnaha River Basin
Objectives for each NPT project are:
Project 1. 199703000 - Chinook Salmon Adult Abundance Monitoring (Includes Fast Track Joseph Creek Steelhead Escapement Monitoring project).
This project provides high precision population status and trend information for Secesh River spring/summer Chinook salmon (Oncorhynchus tshawytscha) and Joseph Creek steelhead (O. mykiss) that are considered a

highest priority for informing management decisions. Population specific adult abundance and productivity data is used by multiple entities in the Columbia Basin (e.g. assessing Endangered Species Act (ESA) listing status, harvest season opportunities, and effectiveness of management actions - in this case supplementation). In the simplest form, but likely most important, is the ability to describe a population's abundance relative to management goals/thresholds; quasi-extinction, viability, sustainable harvest, and ecological process.
Subobjective 3.2: Estimate natural origin adult steelhead escapement, hatchery composition, migration timing, age structure and life history characteristics in Joseph Creek on an annual basis.
Task 3.2.1 Install a resistance board weir (floating weir) with upstream and downstream traps prior to the steelhead migration period.
Task 3.2.2 Operate and maintain the floating weir monitoring site continuously during the steelhead migration period on a daily basis to ensure safe operation of the facility. Collect adult steelhead data for origin, length, sex, marks (fin clip, PIT tag, CWT), scale sample, and tissue sample (DNA).
Task 3.2.3 Install constantly recording thermographs and collect hourly water temperature data at the monitoring site.
Task 3.2.4 Use the Joseph Creek stream flow monitoring station data collection to estimate daily stream discharge.
Task 3.2.5 Quantify daily and total adult steelhead passages into Joseph Creek on an annual basis. Estimate the steelhead hatchery composition. Estimate escapement with associated variance estimators (95% C.I. and CV's).
Task 3.2.6 Compare the weir mark recapture steelhead escapement estimate with the PIT tag array escapement estimate.
Task 3.2.7 Determine steelhead migration timing at the monitoring site. Correlate migration timing with water temperature and staff gage or stream discharge information.
Task 3.2.8 Compare mark recapture escapement estimate with steelhead redd count survey data. When time series allows conduct linear regression between escapement and redd count data.
Task 3.2.9 Remove the resistance board weir steelhead escapement monitoring site after the spawner migration is completed.
Task 3.2.10 Provide a quality control checked database for all project information.

Project 2. 201003200 - Adult Steelhead Escapement Monitoring - Imnaha River Subbasin
To establish steelhead population status information in the Imnaha River Subbasin to support a scientifically defendable fisheries management process and to provide society with information regarding recovery of the population.
Management Questions: Managers and policy makers also require specific information for their processes. Answers to the following questions will help inform managers and policy makers.
• What is the status of wild steelhead adults in the Imnaha River Subbasin? (abundance and population growth rate)
• What behavior attributes of adult steelhead migration impact tributary specific population dynamics? (metapopulation structure)
• What is the genetic stock structure (gene flow, effective population size in relation to actual anadromous adult returns, genetic diversity/ heterozygosity) of anadromous steelhead across tributaries in the Imnaha River Subbasin? (genetic)
• What is the rate of dispersion of hatchery produced fish to non-outplanted tributaries in the Imnaha subbasin? (hatchery:natural interactions and distribution)
• Are returns of hatchery and wild origin adults to Little Sheep Creek or a subset of tributaries representative (abundance and characteristics) of wild steelhead to the entire Imnaha River Subbasin? (distribution and scale of needed monitoring)
OBJECTIVE 1: Installation and Maintenance of Floating Weirs and PIT Tag Arrays.
OBJECTIVE 2: Quantified Steelhead Escapement and the Collection of Biological Data
OBJECTIVE 4: Coordination of Project Activities and Effective Communication of Results
OBJECTIVE 5. Properly Administered Imnaha Steelhead Escapement Monitoring Project.
Project 3. 201005700 - B-run Steelhead Supplementation Monitoring Project
This project provides: 1) hatchery (supplementation and conventional) monitoring on B-run steelhead (Oncorhynchus mykiss) released in the Clearwater River subbasin, 2) incorporation and validation of PIT tag array-based status and trend estimates of adult abundance, 3) descriptive biological data on natural-origin returns, and 4) facilitation of a run-reconstruction of Snake Basin steelhead to known and unknown areas (formally proposal 2010-04-800). Carried out by co-managers, the Nez Perce Tribe (NPT) and the Idaho Department of Fish and Game (IDFG), this project will play a critical role in increasing the existing understanding of two significant

populations of B-run steelhead in the Clearwater River major population group (MPG), the Lolo Creek and the South Fork Clearwater River (SFCR) populations. Data generated through the implementation of this project is required under the FCRPS BiOp (RPAs 63.1, 71 and 72) and is consistent with the Coordinated Anadromous Workshop Snake Basin strategy for high precision abundance data, hatchery effectiveness monitoring, and data management.
Deliverables accomplished through the implementation of this project include:
1) Determine and compare the relative reproductive success of natural and supplementation B-run steelhead in Lolo Creek.
2) Determine and compare life-stage specific survival rates for Lolo Creek (natural and supplementation) and South Fork Clearwater River (natural, supplementation, and conventional).
3) Determine the adult and juvenile life history characteristics of natural and supplementation B-run steelhead.
4) Determine the influence, proportion, and rates of naturally spawning fish that are stray (conventional hatchery origin) fish in the stream.
5) Determine the relative abundance of natural, supplementation, and conventional hatchery fish in the spawner abundance and in the brood stock.
6) All hatchery production marked with CWT, a portion with ad-clips (conventional), and a representative sample with PIT tags.
7) Determine and compare the in-stream and in-hatchery productivity of natural, supplementation, and conventional hatchery fish.
8) Determine and compare the adult distribution of hatchery (conventional and supplementation) and natural origin steelhead in the South Fork Clearwater River.
9) Run reconstruction of steelhead over Lower Granite Dam (annually)- comanagement task.
10) Provide annual reports, metadata and performance measure data to DFRM database.
The hypotheses to be tested through the work of this project include:
1) The annual abundance of natural B-run steelhead in Lolo Creek and the South Fork Clearwater River are increasing (annual monitoring for 15 years).
2) Lolo Creek natural and supplementation B-run steelhead relative reproductive success is not different, calculated at three life stages (young of the year, smolts, and adult returns) (annual monitoring for 15 years).
3) Lolo Creek natural and supplementation steelhead survival, behavior, and performance are not different. Performance measures to be tested include: juvenile survival to Lower Granite Dam, mainstem arrival timing, smolt-to-adult return rates (SARs), and adult run-timing (10 years).
4) Supplementation and conventional steelhead survival, behavior, and performance in the SFCR is not different. Performance measures to be tested include: juvenile survival to Lower Granite Dam, mainstem arrival timing, smolt-to-adult return rates (SARs), adult run-timing, in-hatchery life-stage specific survival, fecundity, size at release, and conversion rates of adults between Lower Granite Dam and the SFCR (10 years).
5) The spatial distribution of natural, supplementation, and conventional adults in the SFCR is not different (5 years).
6) Relative natural production between Lolo Creek and SFCR remains constant over time. Measured as juveniles per recruit (15 years).
Project 4. 199800702 – Grande Ronde Evaluation Studies
The objective is to determine status and population trends of steelhead and bull trout populations in the Lostine River.
WE 157: Collect Field Data:
Population scale abundance and productivity estimates with known accuracy and precision do not exist for most Snake River steelhead populations. FCRPS BiOP RPA 50.6 and 63.1 require additional steelhead population status information and action agencies have identified the Lostine River as cost effective opportunity to obtain such information in their December 1, 2009 Draft Recommendations for Implementing Research, Monitoring and Evaluations for the 2008 NOAA Fisheries FCRPS BiOp by extending the operating period of the Lostine River weir to cover steelhead return period. Within the Coordinated Anadromous Workshop process the Nez Perce Tribe expressed ability to conduct this additional trapping effort after replacing a degrading weir structure. Construction of a new weir occurred in 2010 and operation period of the new weir facility will commence in mid-February to monitor steelhead under the Lostine River O&M contract. Weir operations will target a census count and collection of biological data (size, sex, origin) of steelhead across their entire run-period. In additional trapped fish will be marked in manner to enable mark-recapture estimation of abundance in the case the weir is not 100% efficient. Downstream moving kelts encountered at the weir will serve as recaptures. Data will be obtained from the Lostine River O&M contract.

WE 162: Analyze/Interpret Data:
The total number of steelhead captured at the weir will be enumerated by origin as a census count. Steelhead collected as carcasses or downstream swimming kelts will be examined for marks applied at the weir and enumerated by origin and mark type. A mark recapture population estimate will be generated in the event that a portion of the recovered steelhead carcasses and kelts were not marked at the weir.

Project 5. Lower Snake River Compensation Plan Hatchery Evaluation Studies
Objective 4. Determine adult steelhead abundance and spatial structure in the Imnaha River subbasin.
Task 4.1. – Install and operate a flat-panel floating weir in Horse, Cow, and Lightning creeks on a rotational basis for adult steelhead escapement and hatchery:natural composition.
Task 4.2. –Install the resistivity weir in Camp Creek with video validation to get an adult steelhead escapement estimate by origin.
Task 4.3. – Use resistivity-enumerated adult escapement estimate and Oregon Departement of Fish & Wildlife redd count surveys in Camp Creek to estimate fish per redd and other key parameters.
Task 4.4. - Maintain constant recording thermographs in Horse, Cow, Lightning, and Camp creeks to characterize water temperatures.
Task 4.5. - Describe the adult steelhead spawner migration timing in relation to water temperature and stream discharge in Horse, Cow, Lightning, and Camp creeks.
Task 4.6. - Prepare annual reports summarizing adult steelhead escapement monitoring activities.

Task 4.7. – Continue to coordinate the development of juvenile steelhead emigration trapping equipment and study design for the Little Sheep Creek Facility with ODFW.
Task 4.8. – Coordinate the implementation of systematic adult steelhead escapement sampling in other key tributaries in the Imnaha River subbasin.
Task 4.9. – Work with NOAA Fisheries to complete genetic stock structure analysis of steelhead in the Imnaha River subbasin. Utilize adult samples in Cow and Lightning creeks to finalize study.

Description: Snake River basin steelhead spawn and rear in the tributaries of the Snake River in southeast Washington, northeast Oregon, and central and western Idaho. The Tucannon, Asotin, Grande Ronde, Salmon, Imnaha, and Clearwater river subbasins contain extant populations though severely declining population numbers led to the listing of the DPS as threatened under the Endangered Species Act on August 18, 1997.

This application is requesting ESA coverage for activities from five separate Nez Perce Tribe Projects:
1. 199703000 - Chinook Salmon Adult Abundance Monitoring (Includes Fast Track Joseph Creek Steelhead Escapement Monitoring project)
2. 201003200 - Adult Steelhead Escapement Monitoring - Imnaha River Subbasin
3. 201005700 - B-run Steelhead Supplementation Monitoring Project
4. 199800702 – Grande Ronde Evaluation Studies
5. Lower Snake River Compensation Plan Hatchery Evaluation Studies

Assessment of the escapement of adult and juvenile steelhead to the mouth of the Imnaha, Grande Ronde, and Clearwater rivers with specific data on the metapopulation structure to specific spawning aggregates is needed. Given the logistical constraints (spring run-off and large number of spawning aggregates) comprehensive monitoring of adult steelhead escapement and genetic stock structure is not feasible because of funding. The use of temporary/portable picket/resistance board weirs facilitates objectives to evaluate where key/primary spawning aggregates throughout the subbasin are monitored and where spawning aggregates within a limited area of the subbasin are sampled. This approachs provides critical information for understanding the metapopulation status and dynamics of steelhead in the Imanah,Grande Ronde, and Clearwater River subbasins. Key tributaries in the Imnaha subbasin include: Cow, Lightning, Horse, Big Sheep, Camp, Little Sheep, Freezeout, Grouse, Crazyman, Mahogany and Gumboot creeks, and in the Grande Ronde subbasin include: Joseph Creek, Lostine, Minam, and Wenaha rivers, and the Clearwater subbasin include: South Fork Clearwater, and Lolo Creek (other major areas covered under other projects).

The Imnaha River subbasin represents one of at least five major populations of A-run steelhead upstream of Lower Granite Dam (NMFS 2000). Historically, the Imnaha River supported a vital run of summer steelhead. According to the U.S. Army Corps of Engineers, historic peak escapement of A-run summer steelhead to the Imnaha subbasin was estimated to be 4,000 fish (USACE 1997). Like many steelhead populations in the Pacific Northwest, Snake River steelhead have declined significantly (Nehlsen et al. 1991). Today, all Snake River steelhead (Oncorhynchus mykiss) are listed as threatened under the Endangered Species Act. The NOAA Fisheries Service estimated the current population growth rate (lambda) for the A-run component of the Snake River steelhead Evolutionary Significant Unit (ESU) at 0.72 to 1.0 (CRI 2000) based solely on counts of A-run steelhead to Lower Granite Dam.

Joseph Creek is a tributary to the lower Grande Ronde River and contains a native run of anadromous steelhead (Cat Tracks Wildlife Consulting 2004). The Joseph Creek system is managed as a wild fish management area by the Oregon Department of Fish and Wildlife (ODFW). Grande Ronde Subbasin Plan EDT modeling estimated the steelhead spawner abundance in Joseph Creek had declined by 80% compared to historic levels, but contained a model-estimated 621 fish. The Subbasin Plan also provided another steelhead population estimate of 945 fish conducted by the ODFW. Although steelhead in the Snake River basin are listed as a threatened species, Joseph Creek exceeds ICTRT viability thresholds. NOAA Fisheries (2008) estimated that Joseph Creek had a 10 year geometric mean abundance of 2,132 fish, between 1996 and 2005, based on redd count expansion. Steelhead in Joseph Creek were estimated to meet ICTRT (2007) abundance and intrinsic productivity viability criteria. The recommended viability threshold was 500 fish. If the expanded redd count estimates of abundance are correct, adult steelhead returning to Joseph Creek would represent a significant portion of the unmarked steelhead counted passing Lower Granite Dam.

The Clearwater River major population group (MPG) is composed of five extant (Clearwater River lower mainstem, Lochsa River, Lolo Creek, Selway River, and South Fork Clearwater River) and one extinct (North Fork Clearwater River) population. This MPG is included in the Snake River DPS although the Lewiston Dam, in place from 1927-1973, greatly limited passage into the Clearwater and severely lowered population numbers in the Clearwater MPG. There are no estimates for the historical abundance in either Lolo Creek or the South Fork Clearwater River (HSRG 2009). The minimum number of natural spawners necessary to meet the MPG viability standards for 4 of the 5 extant populations is 4,500; however, currently the biological status of the Clearwater River subbasin populations is unknown (NOAA Fisheries and Idaho Office of Species Conservation 2006).

Currently there is little quantitative information available to determine the abundance of spawning adult steelhead in tributary streams above Lower Granite Dam (Busby et al. 1996; CRI 2000). Escapement estimates for Snake River steelhead to Lower Granite Dam are determined from counts at Lower Granite Dam. This estimate represents the most consistent, longest, and one of the few quantitative indicators of Snake River steelhead abundance.

However, resource managers are not currently monitoring the effectiveness of Snake River steelhead conservation actions for a threatened species at an ecologically appropriate scale (Botkin et al. 2000). Monitoring the status of subpopulations provides more detailed information on the status of the species than does an aggregate measure of abundance (NOAA Fisheries Service 2009). Yet, population abundance, growth rate, spatial distribution and diversity of steelhead in tributary specific areas in the Snake River Basin are functionally non-existent. Although some Imnaha, Grande Ronde, and Clearwater rivers adult steelhead information is available

from limited redd counts and a few small tributary weirs, it is unknown if these sources are suitable as an index of trend or even representative of the entire Subbasins (Saul et al. 2004). Steelhead redd counts are not physically possible throughout most the Imnaha, Grande Ronde, and Clearwater River drainages due to inaccessibility and high turbidity.

Therefore, accurate and comprehensive adult steelhead abundance information for the entire Imnaha, Grande Ronde River, and Clearwater subbasins represents a critical data gap (Saul et al. 2004).

Adult and juvenile escapement (demographic) information and genetic profile information would be collected on streams of close geographic proximity in the Imnaha Basin (Cow, Lightning, and Horse) and/or (Big Sheep, Camp, Little Sheep, Freezeout, Grouse, Crazyman, Mahogany, Gumboot creeks) Grande Ronde Basin (Joseph Creek, Lostine, Minam, and Wenaha rivers) and the Clearwater Basin (South Fork Clearwater, and Lolo Creek). It is recommended that systematic sampling of the adult escapement in key metapopulation structure spawning aggregates be continued. The Nez Perce Tribe Department of Fisheries Resources Management currently has five projects funded and one proposed to complete this work. Four of the projects are funding by Bonneville Power Administration ((201003200, 1997030000, 201005700, 199800702) and one project funding by the Lower Snake River Compensation Plan. These projects focus on the Imnaha tributaries, Grande Ronde tributaries, and Clearwater tributaries. Operation juvenile and adult activities will occur annually in the Imnaha, Grande Ronde and Clearwater Basins.
Hydrology and engineering analysis of stream depth, stream velocity and stream discharge information has been collected in the tributaries of the Imnaha, Grande Ronde, and Clearwater rivers. Based on this analysis, logistical consideration of field staffing and sampling approaches discussed above, the Tribal evaluation program will implement a sampling strategy to enumerate adult steelhead spawner escapement in Cow, Lightning, Horse, Big Sheep, Camp, Little Sheep, Freezeout, Grouse, Crazyman, Mahogany and Gumboot creeks in the Imnaha Basin; in the Grande Ronde subbasin include: Joseph Creek, Lostine, Minam and Wenaha rivers (Asotin, Alpowa, are currently monitored by Washington Department of Fish and Wildlife); in the Clearwater Bain include: South Fork Clearwater and Lolo Creek.

Determination of adult steelhead escapement at the population level is extremely difficult given the challenge of sampling in large rivers, during peak spring runoff, high turbidity levels, and associated debris loads. Not many researchers have reported successful steelhead escapement monitoring results given these challenges (Mayer et al. 2008, Bowersox 2008). Adult monitoring techniques such as resistivity counters (McCubbing et al. 2000) or DIDSON (Kucera and Faurot 2005) rely on optical camera validation of counts for species identification which becomes non-functional during high stream turbidity and elevated stream flows. Monitoring of the steelhead spawner escapements into the Imnaha, Grande Ronde, and Clearwater River Basins will face all of these challenges. In addition, the ISEMP project (BPA Project No. 200301700) has a fast track proposal to install PIT tag arrays in lower Joseph Creek and lower and upper Imnaha River. These will be relied upon to provide one measure of steelhead population escapement into these basins.

Resistance board weirs (floating weir) and traps are proposed for adult steelhead monitoring in the Imnaha, Grande Ronde, and Clearwater River basins. Resistance board weirs have been used for steelhead escapement monitoring in other stream systems (Mayer et al. 2006, Bill Young – personal communication). Several uncertainties exist with the selection of this enumeration method, namely site selection and impedance related concerns. We acknowledge that impedance is a potential concern when operating a weir. This project has demonstrated that it is very sensitive to fish impedance related concerns. Salmon escapement monitoring has designed and used techniques that allow unimpeded fish passage and no trapping or handling of adults.

The intent of the project is to obtain high precision and accuracy steelhead escapement information (Coordinated Anadromous Workshop 2010). There is no guarantee that that is accomplishable. Floating weirs have never been operated in some of these systems, the streams exhibit flashy spikes in discharge, and historic discharge readings have been as high as 1,580 cfs. It is unknown how floating weirs will operate given the hydrologic conditions in some of these systems. Locally, floating weirs have been operated under stream discharge conditions as high as 1,600 cfs in the Lostine River (Peter Cleary – Personal communication). Resistance board weirs are designed to essentially flatten down under high stream discharge and, in theory, let high flow and debris pass over the top of the structure. We will also rely on the proposed PIT arrays, located downstream of the floating weirs, to provide steelhead escapement estimates. There has been an emphasis on implementing PIT tag array technology in the Snake River basin to estimate adult steelhead and salmon escapement. This project, if successful, will provide a validation of the PIT tag array steelhead escapement estimates over a range of environmental conditions. This will be the first time a validation of PIT tag array steelhead escapement will be provided to the authors knowledge.

Juvenile steelhead will be evaluated in Joseph Creek, Lostine, Wenaha, South Fork Clearwater, and Lolo Creek. The primary data collection methods used to monitor and evaluate juvenile abundance, survival-productivity, distribution, and life history characteristics are through the migrant trap and marking program. This occurs both in the hatchery and in the field via a rotary drum screw trap.

In the South Fork Clearwater adult spawner spatial distribution, prespawn mortality, adult run timing, and spawn timing. A radio tagging study will be completed to accomplish this objective. Adults will be radio tagged in two locations, Lower Granite Dam (LGD) and from angling in the South Fork Clearwater River (SFCR). Utilizing the Separation by Code (SbyC) known destination fish can be diverted to the LGD sample room and radio tagged. This will allow for an evaluation of these three separate groups of steelhead: 1. Natural umarked fish from SFCR; 2. Hatchery unmarked supplementation fish; 3. Conventional adclipped hathcery fish. Marking of these group with PIT tags will be accomplished at the hatchery for supplementation and conventional fish prior to release (in sufficient numbers to return as adults) and from the rotary screw trap for juvenile natural fish (numbers may not be sufficient to ensure enough PIT tagged adults return to LGD) . This will allow for an evaluation of these three separate groups, to be tagged and tracked from LGD to the SFCR, and then evaluated within the SFCR to quantify the performance measures listed above. If sample size of returning natural fish PIT tags is limited, then an angling effort within the lower portion of the SFCR will increase the sample size of natural unmarked fish.

Supplemental Information

Status of Species: Steelhead production areas previously identified are subbasins of the Grande Ronde River, lower Clearwater River, lower and upper Salmon River and the Imnaha River (NOAA Fisheries Service 2000). An adult collection facility in Little Sheep Creek, another Imnaha tributary, provides annual counts of hatchery and natural steelhead. The Nez Perce Tribe monitors natural adult escapement into the lower spawning tributaries of the Imnaha. Annual escapement into those streams has been determined since 2000. Estimates have ranged from 39 to 128 in Cow Creek and 36 to 232 in Lightning Creek. Joseph Creek, a tributary to the lower Grande Ronde River and contains a native run of anadromous steelhead (Cat Tracks Wildlife Consulting 2004). Index area and supplemental area steelhead redd count surveys have been conducted by the ODFW since the 1960's in Joseph Creek (Jeff Yanke – personal communication). Redd counts, that were collected consistently from 10 streams in the Joseph Creek drainage, averaged from 0 to 26 redds per mile of stream annually. In addition, hatchery steelhead supplementation occurs in the Grande Ronde River (Schuck 1998, Whitesel et al. 1998) and the amount of hatchery straying into the Joseph Creek system is unknown. Grande Ronde Subbasin Plan EDT modeling estimated the steelhead spawner abundance in Joseph Creek at 621 fish. The Subbasin Plan also provided another steelhead population estimate of 945 fish conducted by the ODFW. Although steelhead in the Snake River basin are listed as a threatened species, Joseph Creek exceeds ICTRT viability thresholds. NOAA Fisheries (2008) estimated that Joseph Creek had a 10 year geometric mean abundance of 2,132 fish, between 1996 and 2005, based on redd count expansion. Steelhead in Joseph Creek were estimated to meet ICTRT (2007) abundance and intrinsic productivity viability criteria. There are no estimates for the historical abundance in either Lolo Creek or the South Fork Clearwater River (HSRG 2009).

Methods: Resistance board weirs (floating weir) and traps are adult steelhead monitoring tools, given the desire for escapement data, hatchery composition, and age structure information on the population (RM&E Workshop). Resistance board weirs have been used for steelhead escapement monitoring in other stream systems (Mayer et al. 2006, Bill Young – personal communication). Several uncertainties exist with the selection of this enumeration method, namely site selection and impedance related concerns. We acknowledge that impedance is a potential concern when operating a weir. This project has demonstrated that it is very sensitive to fish impedance related concerns. Salmon escapement monitoring has designed and used techniques that allow unimpeded fish passage and no trapping or handling of adults.

We propose to use resistance board weirs, with upstream and downstream traps, in combination with underwater optical cameras. The weirs would be operated representatively over the steelhead spawner migration (late November through mid June). The upstream trap would be designed to function in a trap mode or in a passage mode allowing unimpeded upstream passage. Underwater optical cameras may be used to ensure impedance is not occurring and to document passage during open passage periods.

The rigid trap box is placed next to the bank next and the anchored upstream portion of the panels. A small deflector fence is installed upstream of the trap box to deflect debris onto the floating panels. This design allows for logs and accumulation of smaller debris to pass over the top of the floating panels by simply sinking the floating panels enough to push debris downstream and resume floating when the excess weight is removed by stream flow.

Steelhead in the upstream movement box will dipped out with cotton dip net and place into a moist canvas sling/measuring box. Data including fin clips, PIT tags, sex, spawning condition (pre/post), and fork length will be recorded. Scales will be collected from just behind the dorsal fin and above the lateral line using a blunt knife and forceps. A paper hole punch will be used to collect fin tissue from the caudal or dorsal fins for DNA genetic characterization before release upstream of the trap. An opercular punch will be given using a paper hole punch or uniquely numbered Tyvek disk tag will be applied to the right operculum, or uniquely numbered floy tag administered to the dorsal sinus. Each fish will also receive a PIT tag for future detections on passover PIT tag arrays and downstream dams (kelts). Steelhead and non-target species will be measured and released above the weir.

Steelhead captured in the downstream movement box will be examined for opercular punches, Tyvek, floy, and PIT tags. Marked fish will be checked for spawning condition (pre or post-spawn) and released downstream. Downstream moving non-marked steelhead and non-target species will be handled with the same procedures as upstream moving fish with the exception of a downstream release.

It is likely that weir/trap operation will be discontinuous due to high flow and debris. Depending on the relationship of the non-operation dates to run timing and the period of time traps are not operated assumptions could be violated. Testing of the assumptions and selection of the most appropriate mark/recapture approach will be done on an annual basis. Unbiased estimates of population abundance can achieved with as few as four recaptures (Cousens et al 1982). Recent studies using similar methods in the Imnaha River subbasin have demonstrated the ability to recapture 40 to 50 percent of marked fish (over 15 recaptures). Adjusted Peterson (Chapman 1951; Seber 1982), and Schaefer (1951) estimates are commonly used but biased if assumption are not met (Cousens et al 1981). McGregor et al. (1991) used stratified population estimation (Chapman and Junge 1956; Darroch 1961) due to ability to accommodate varying capture probabilities in tagging and recovery. We will use this approach and stratify upstream trapping time periods if the tests of chi-square tests of tagged to untagged recoveries over time are violated. Stratified abundance estimates have larger confidence intervals than un-stratified. Cappiello and Bromanghin (1997) discuss using Bailey closed population model (Seber 1982) and used coefficient of variation describe the relative accuracy and precision of the multiple population estimates. Special mention is made that the methods should be tested under low abundance levels, due to increased needed accurate and precise estimates of minimum escapements. This may likely be the case in the study streams being addressed. Rajwani and Schwarz (1997) address adjustment of estimates for missed tags in salmon escapement surveys. We do not believe that missed tags identification is an issue with our study design. Fish receive two marks,

which have long-term retention and easy identification. Multiple software packages exist that compute mark/recapture population estimates, including Arnason at al. 1996 and SPAS which computes Darroch, Schaefer, Pooled Petersen, least-squares, and maximum likelihood (ML) Darroch estimates.

Tissue samples will be collected from all adult steelhead. Fish from these tributaries will be characterized by using a suite of microsatellite markers. This work will complement similar analysis that is ongoing under the Fish and Wildlife Service's Lower Snake River Compensation Plan (LSRCP) evaluation studies on juvenile steelhead in 20 tributaries in the Imnaha, Grande Ronde, and Clearwater river subbasins and to support the ongoing GSI study at Lower Granite Dam. The primary objective is to describe the genetic stock structure, gene flow between spawning aggregates, and determine effective population size.

PIT tag arrays, located downstream of the weirs, may also provide data to see if PIT tagged adults appear to reject the weir structure. The downstream trap would be operated in the trap mode continuously for recapture of marked or unmarked adults.

The PIT tag arrays will be relied upon to provide an escapement estimate to tributaries of the Imnaha, Grande Ronde, and Clearwater rivers. If sufficient numbers of steelhead are marked and recaptured at the floating weirs we will provide a cross validation of the PIT tag array escapement estimate. To the authors knowledge this has not been accomplished for steelhead to date. With the emphasis of PIT tag array monitoring in the Snake River basin, this paired escapement estimate will provide a valuable contribution to regional RM&E plans. Steelhead population estimates may use one of the mark-recapture population estimators; probably an adjusted Petersen estimator (Seber 1982). The adjusted Petersen estimate is a commonly used mark-recapture method that provides an unbiased estimate of the population (Cousens et al. 1982). Assumptions are that no marks are lost, marked and unmarked fish survive at the same rate and have equal catchability, and that marked fish are randomly distributed. Associated variance estimators of 95% confidence interval and coefficient of variation (CV) will also be calculated. If the 95% confidence interval of the mark-recapture estimate overlaps the PIT tag array escapement estimate we would assume no significant difference between the two escapement estimates. The adjusted Petersen mark-recapture formula is:

$$\frac{M \times C - 1}{R}$$

Where: M = number marked upstream
C = number captured downstream
R = recaptured downstream

The variance for this estimate is calculated by:

$$\text{Var}(N) = \frac{(M+1)(C+1)(M-R)(C-R)}{(R+1)2\,(R+2)}$$

Steelhead escapement estimates, PIT tag array and/or weir estimates, will be used in conjunction with redd count information collected by the ODFW. After a minimum of five years of high precision and accuracy weir based estimates, the data will be analyzed via linear regression to determine if redd counts are a good predictor of escapement. It is also desired to have a range in escapement over this five year period.

The intent of the work plan is to review the work products after five years of high precision and accuracy weir based escapement estimates. In 2017, this would be the earliest that project results could be evaluated to determine if the project would continue. If high precision and accuracy data were not available or project operation needed to be adaptively managed to collect the necessary data, the review date would be later than 2017.

The intent of the projects is to obtain high precision and accuracy steelhead escapement information (Coordinated Anadromous Workshop 2010). There is no guarantee that that is accomplishable. It is unknown how a floating weir will operate given the hydrologic conditions in some of these tributaries. Locally, floating weirs have been operated under stream discharge conditions as high as 1,600 cfs in the Lostine River (Peter Cleary – Personal communication). Resistance board weirs are designed to essentially flatten down under high stream discharge and, in theory, let high flow and debris pass over the top of the structure. We will also rely on the proposed PIT arrays, located downstream of the floating weirs, to provide steelhead escapement estimates. There has been an emphasis on implementing PIT tag array technology in the Snake River basin to estimate adult steelhead and salmon escapement. This project, if successful, will provide a validation of the PIT tag array steelhead escapement estimates over a range of environmental conditions. This will be the first time a validation of PIT tag array steelhead escapement will be provided to the authors knowledge.

Intensive life cycle monitoring, that would quantify juvenile emigrant steelhead abundance, is operational in the Imnaha, Grande Ronde, and Clearwater basins given the direction of the Coordinated Anadromous Workshop (2010 a, b, and c). In additions remote PIT tagging of juvenile steelhead similar to the ISEMP (2003) studies in the South Fork Salmon River could be implemented to provide known tributary PIT tagged fish for life stage specific survival and smolt-to-adult survival estimates. This effort if desired could be added on to the existing project, the ISEMP project, or the Oregon E-map project for a small additional cost. In addition, the genetic structure of steelhead populations in the Snake River basin is of vital concern under the ESA. Adult steelhead tissue samples will be collected from this project and archived for contribution to regional DNA analysis. Analysis of these samples may help understand the effect of supplementation programs in the Snake River basin and specifically the effect of stray hatchery steelhead in the Intensive life cycle monitoring, that would quantify juvenile emigrant steelhead abundance, is operational in the Imnaha, Grande Ronde, and Clearwater basins.

The primary data collection methods used to monitor and evaluate juvenile abundance, survival-productivity, distribution, and life history characteristics are through the migrant trap and marking program. This occurs both in the hatchery and in the field via a rotary drum screw trap.

The emigration timing and abundances of wild and naturally produced Chinook salmon and steelhead will be determined through a trapping and marking program. Floating rotary screw traps manufactured by E.G. Solutions Inc., Corvallis, Oregon will be used to capture emigrating juvenile salmonids in the Joseph Creek, Lostine, Wenaha River, Lolo Creek and South Fork Clearwater River. The screw traps are attached to a cable suspension system anchored by gabion baskets, which allow side to side and upstream/downstream movement of the trap. This setup permits the trap to be fished in the optimum position during most flow conditions. The traps consist of a trapping cone (1.5 m diameter) supported by a metal A-frame, live box, two six-meter by one-meter pontoons for flotation, and a clean-out drum. Traps used on the Imnaha River have been modified to use a customized oversize live box 1.68 m wide x 1.25 m long x 0.55 m deep and fitted with a removable baffle to dissipate water velocity during high flows plus extra flotation on each pontoon to prevent the trap from sinking in high flows. Additionally, one of the Imnaha traps has been modified with a bypass that is equipped with a Biomark PIT Tag Racquet Antennae tuned for underwater use. Data is logged on a standard FS2001 transceiver.

Trap operation is planned to be continuous, however, there were times when traps can not be operated due to low flow or freezing conditions, excessive debris, or mechanical breakdowns. We assume there is very little downstream migration past our traps during December and January.

The live boxes of the screw traps are checked every morning (several times throughout each night and day during high water, storms, or ice-up events). Piscivorous fish and large numbers of incidentally captured fish are removed from the live box and scanned for PIT tags. Mortality due to trapping is noted and recorded.

Processing procedures are similar to those used by Ashe et al. (1995) and Prentice et al. (1990b). On a daily basis, juvenile summer Chinook captured in the trap are removed, placed in 18.9-liter plastic holding buckets, and transported (40-80 meters) to a data processing area. Fish are then transferred to flow-through work-up vats or vats with appropriate aeration where they are held prior to being moved to an aerated work-up tub.

All fish are interrogated for PIT tags using a Destron® loop-style detector and reader, examined for PIT tag scars, marks, and overall physical condition. Fish are measured to the nearest millimeter and weighted to the nearest gram. Fish are anaesthetized in a plastic tub filled with 6 liters of water, 15 milliliters of standard stock solution (15 grams/liter) of MS-222, and buffered with 15 milliliters standard stock solution (30 grams/liter) of sodium bicarbonate to decrease stress and mortality (e.g., McCann et al. 1994). Stress Coat® (1 part Stress Coat® per 1 part distilled water) is also used in work up tubs, on measurement boards and scale tubs in an effort to replace the natural protective slime coating that may have been compromised by handling or measurement-related stress.

Upon anesthetization, unmarked or non-tagged fish are identified for tagging or marking. Fish selected for PIT tagging will be examined for previous PIT tagging, descaling and general health before being tagged, measured (fork length-mm) and weighed (0.1 g). All fish greater than 60 mm are selected for tagging unless they have been damaged during the trap operation. All PIT tags are implanted using methods similar to those described by Prentice et al. (1990a, 1990b) and the CBFWA PIT Tag Steering Committee (1999). Tagging is done manually using a modified hand injector unit consisting of a 10cc syringe; steel rod, compression spring, push rod and 12-gauge hypodermic needle. Tagging needles and PIT tags are disinfected before each use by soaking them for 10 minutes in 70% ethyl alcohol, and subsequently dried for 10 minutes. The needles, which are pre-loaded with PIT tags, are inserted into the fish so that the beveled tip completely penetrated beneath the surface of the skin at a point on the midline of the ventral surface posterior to the pectoral fins. Fish are measured to the nearest millimeter (fork lengths), weighed to the nearest gram using an electronic scale, and placed in a flow-through recovery vat or vat with appropriate aeration. Tagging is discontinued when water temperatures exceed 18 C. Tagging data are proofed for mistakes. Tagging and interrogation files are submitted to the Pacific States Marine Fisheries Commission's PIT Tag Information System (PTAGIS) database within 48 hours following collection. PIT tag interrogation data are downloaded from the PTAGIS database for the annual reports.

Scale samples will be randomly collected from 25 steelhead juveniles for each trap and each month to analyze early life history scale patterns. Only fish that are not going to be PIT tagged are sampled. Scales are collected from just behind the dorsal fin and above the lateral line using a blunt knife. Scale samples are filed by stream and date of collection at the Nez Perce Tribe's Department of Fisheries Resource Management. Scales are filed in envelopes commercially available and are labeled with the following collection information: date, location, length, weight, and existing marks. Nez Perce Tribe staff will read the

scales and provide the age information.

During certain time periods a large portion of the young of the year (YOY) juveniles collected in the screw traps are too small to be PIT-tagged (e.g., CBFWA 1999). In order to represent the entire population, a sub-sample of all fish for trap efficiency estimates are uniquely marked with a mark that could be applied to any size fish that were captured. Three times a week, a sub-sample of the total trap catch are selected for staining with Bismark-Brown dye, a mark that has proven effective in the identification of fish with fork lengths as low as 30 mm (Lockhart et al. unpublished data). Fish are held in dye (0.4g/16 L solution) for 1 h. Battery powered aerators are used to maintain oxygen saturation in the dye solution and the temperature is monitored constantly. To evaluate possible delayed mortality and to reduce predation, stained fish are held in live boxes until dusk and are released at the same time and at the same site as PIT tagged fish.

Freshly marked or tagged fish are placed into an 'upstream' live box, while recaptures or incidental catches are placed into a 'downstream' live box. Larger or piscivorous specimens are placed into a separate live boxes to reduce the potential of predation. The live boxes are large, drilled-out plastic shipping boxes with lids or covered 33 gallon perforated containers, which provide containment, protection, and acclimation of the fish back to the riverine environment. Marked fish spend no less than 12 h in the live boxes and are released at dusk. These protocols help ensure complete recovery from anesthetic, minimize risk of predation, and promote reintegration and mixing with other fish during peak movement periods. Following their release, boxes are checked for mortalities and shed PIT tags.

Marked or tagged fish that are placed into the 'upstream' live box are used to derive estimates of trap efficiency through their subsequent recapture at the screw trap. The 'upstream' fish are released approximately 800-1200 m upstream of the trap or at least two riffles and a pool upstream of the trap. All other fish are held in separate live boxes and released 200-800 m downstream of the trap. Trap efficiency is determined by releasing a known number of marked or tagged fish above the trap and enumerating recaptures. Trap efficiency is calculated as follows (Murphy et al. Unpublished):

Exceptions to these procedures occur after hatchery releases when upwards of 20,000 fish may be captured in one night. On these occasions fish are removed from the live boxes and released through a FS2001 Destron PIT tag scanner into the river or the traps are pulled to restrict the excessive handling. Catch estimates are made by sub-sampling 10% - 50% of the total number of the fish released for species enumeration and composition. Fish are held in-river in 33 gallon perforated containers until they have been processed.

Water temperature information for each trap site is collected using constant recording HOBO thermographs at each site location. Discharge information is obtained from staff the U.S. Geological Survey gauging stations (www.waterdata.usgs.gov/nwis) if they are in close proximity to the study sites, otherwise staff gauges are utilized.

Juvenile migrant abundance at each trap is estimated for four life-stage-specific juvenile migrants (fry, parr, presmolt, smolt) leaving the tributary. Estimation of the abundance of juveniles migrating by life stage is achieved via mark/recapture of fish captured at the rotary screw trap during the course of the year. Abundance estimates on yearling or precocial Chinook salmon captured in the trap during the summer and fall are not conducted due to low capture rates affecting our ability to obtain robust trapping efficiency estimates.

To calculate brood year-specific migration estimates from rotary screw trap operations we utilize a Gauss program developed by the University of Idaho (Steinhorst 2000). Gauss (Aptech Systems, Maple Valley, Washington) is a structured programming language where the basic variables are matrices rather than scalars. Trap seasons are divided into periods, typically 7 to 10 days in length. Period lengths are selected to minimize environmental variation within each period, which presumably translates to a relative decrease in variation of trap efficiencies within a given period. Fish are marked and released upstream of the trap. The recaptured portion of the marked fish provide an initial calculate p1 and the number of unmarked fish provide an initial N. This information is inserted into the Gauss program which iteratively maximizes the log likelihood, lnL(N,p1) until the estimate does not change significantly (stabilization). Since the estimators do not have a finite expectation, the Bailey (1951) modified estimator (NBsimple h = ch X (mh+1)/(rh+1) is used to determine N (Steinhorst 2000). The maximum likelihood estimates of N and the corresponding confidence intervals require minimal assumptions: 1) fish are captured independently with probability p and 2) marked fish mix with unmarked migrating fish. Our release sites are selected to maximize the probability of mixing between marked fish and the general population.

Length frequency distributions are created and condition factors calculated for each fish species and origin. Condition factor is calculated using Fulton's condition factor: (W/L3) x 105 (Bagenal and Tesch 1978) where W=weight, L=length. Natural steelhead less than 120 mm are assumed not to be smolts and therefore are not used in smolt length, weight, and condition factor calculations.
In the South Fork Clearwater adult spawner spatial distribution, prespawn mortality, adult run timing, and spawn timing. A radio tagging study will be completed to accomplish this objective. Adults will be radio tagged in two locations, Lower Granite Dam (LGD) and from angling in the South Fork Clearwater River (SFCR). Utilizing the Separation by Code (SbyC) known destination fish can be diverted to the LGD sample room and radio tagged. This will allow for an evaluation of these three separate groups of steelhead: 1. Natural umarked fish from SFCR; 2. Hatchery unmarked supplementation fish; 3. Conventional adclipped hathcery fish. Marking of these group with PIT tags will be accomplished at the hatchery for supplementation and conventional fish prior to release (in sufficient numbers to return as adults) and from the rotary screw trap for juvenile natural fish (numbers may not be sufficient to ensure enough PIT tagged adults return to LGD) . This will allow for an evaluation of these three separate groups, to be tagged and tracked from LGD to the SFCR, and then evaluated within the SFCR to quantify the performance measures listed above. If sample size of returning natural fish PIT tags is limited, then an angling effort within the lower portion of the SFCR will increase the sample size of natural unmarked fish.

Lethal Take: Not Applicable

Anticipated Effects on Animals: Potential exists for injury or mortality to ESA listed Snake River adult and juvenile spring and summer Chinook salmon and summer steelhead during the implementation of this project. These fish are handled and released with minimal opportunity for injury. Explanation measures to minimize those effects are listed below. The Nez Perce Tribe Department of Fisheries Resources Management has been operating adult weirs and rotary screw traps for over 20 years and has had Section 10 permit coverage. In the prevous Section 10 permit #1134 renewal we provided a detailed summary of juvenile take from years 2002-2006, we would recommend looking at the permit renewal for that detailed information.

A brief summary of rotary screw trapping from that application is as follows:
Emigrant screw trapping under project 5 has the potential impact Chinook salmon and steelhead through the course of the actual capture and handling of the fish and the marking event of the fish. Permit #1134 separates these events into those two categories Chinook and for steelhead. Those two categories are the number of fish authorized for take (capture handle release, and marking) and the number of fish authorized for unintentional mortality (capture handle release, and marking). These two take options are broken down by species and life stage. A summary of these activities are listed below and broken down take category, life stage and species. In all cases our mortality events were far below what was permitted and this is a result of measures taken to ensure these mortality events are minimized. Methods for minimizing mortality are detailed in the methods sections.

Condensed five-year summary taken from Table 32 of ESA Section 10 Permit #1134 Application.
Chinook salmon
• Adults handled - 53 (250 allowed) with zero mortality
• Juveniles captured handled and released – 884,445 (8,338,315 allowed), mortality – 2,720 (41,690 allowed)
• Juveniles captured handled marked and released – 153,850 (293,000 allowed), mortality – 476 (2,930 allowed)

Summer steelhead
o Adults handled 419 (525 allowed), with zero mortality
o Juveniles captured handled and released – 214,000 (725,000 allowed), mortality – 445 (10,880 allowed)
o Juveniles captured handled marked and released – 39,724 (126,500 allowed), mortality – 21 (1,265 allowed)

Adult take has been permitted under this current permit is as follows:
Adult trapping under permit #1339 has the potential impact Chinook salmon and steelhead through the course of the actual capture and handling of the fish and the marking event of the fish. No adult chinook mortalities have occured under this program so we will only summarize steelehead. Those two categories are the number of fish authorized for take (capture handle release, and marking) and the number of fish authorized for unintentional mortality (capture handle release, and marking). A summary of these activities are listed below and broken down take category. In all cases our mortality events were far below what was permitted and this is a result of measures taken to ensure these mortality events are minimized. Methods for minimizing mortality are detailed in the methods sections.

Condensed six-year summary

Summer steelhead
o Adults captured handled and released – 96, mortality – 0
o Adults captured handled marked and released – 336, mortality – 12

Measures to Minimize Effects to Listed Species: Minimal trapping, handling or tagging occurs during the conduct of this project. NMFS standards for barrier/trap facilities have been incorporated into the study. Potential does exist for slight delays to upstream migrating fish and/or displacement of spawning adults below the weirs but no problems have been observed from other similar projects. The operation of the weirs does capture a number of adult post spawned ESA listed steelhead. These fish are handled and released with minimal opportunity for injury. Potential No delays or displacements are expected to occur as a result of the operation of the PIT tag detector portion of this project. Listed below are steps taken to minimize adverse effects.

The traps would be checked twice a day for trapped fish and debris maintenance.
Steelhead in the upstream movement box will dipped out with cotton dip net and place into a moist canvas sling/measuring box. Data including fin clips, sex, spawning condition (pre/post), and fork length will be recorded. Scales will be collected from just behind the dorsal fin and above the lateral line using a blunt knife and forceps. A paper hole punch will be used to collect fin tissue from the caudal or dorsal fins for DNA genetic characterization before release upstream of the trap. An opercular punch will be given using a paper hole punch or a Tyvek disk tag will be applied to the right operculum, or floy tagged in the dorsal

	sinus, in addition each fish that doesn't have a PIT tag will be marked with one. Non-target species will be measured (sub-sample 25/day/species) and released. Steelhead and non-target species will be release into pool/slack water above the weir. Steelhead captured in the downstream movement box will be examined for opercular punches, Tyvek disk floy, and PIT tags. Marked fish will be checked for spawning condition (pre or post-spawn) and released downstream. Downstream moving non-marked steelhead and non-target species will be handled with the same procedures as upstream moving fish with the exception of a downstream release. Discrete bank observations will be used to determine if the weir is impeding fish movement. Observation will be made daily after installation of the facility both in downstream and upstream locations. Particular attention will be paid to downstream holding areas. If any problems are identified according to the plan criteria, part of or the entire weir will be removed. Emigrant Rotary Screw Trapping There is a potential for mortalities to occur through trapping and handling. We believe that this potential can be minimized through project planning and implementation by experienced research biologists where survival of the fish is the number one priority. Fish trapping, trap maintenance, fish handling, fish anesthesia, and fish PIT tagging protocols are followed explicitly and all staff are trained in their use and application before working under field conditions. We are exploring approaches that will still maintain study design requirements by sub-sampling or reducing trap efficiency if emigrating juveniles become too numerous because of increased run size. Maintaining comparable methods across years is desired and we are seeking adequate take approval in the absence of a restructured sampling approach. Stress and mortality associated with emigration studies are minimized by: Field-staff conduct regular checks of the traps and live boxes throughout the day and night to ensure that traps are maintained and that no mortalities occur. Cones and debris drums are also regularly checked to ensure that traps are not causing fish impingement or descaling and that fine debris is removed from the traps. Water temperatures and stream discharge are regularly monitored to ensure safe capture and handling of all fish.
Resources Needed to Accomplish Objectives:	The Nez Perce Tribe Department of Fisheries Resources Management (DFRM) has been leading manager and comanager in Idaho, Oregon, and Washington for many years. The DFRM operates numerous programs in these states, evaluating salmon and steelhead population dymamics and parameters. This long term experience is also evidenced by our Section 10 take reports given to NOAA annually, documenting the amount of take over the years. This confirms our commitment to utilizing appropriate methods to ensure the safety and well being of the fish listed out in this and other permits. Each of the proposed projects in this permit and our current permit have sufficient funding to continue to operate fish traps and weirs to ensure the saftey of these animals.
Disposition of Tissues:	All tissue samples, snouts, fin rays, otoliths, kidney samples, and scales collected from carcasses will be sent, as needed, to Nez Perce Tribe (NPT), Columbia River Inter-Tribal Fish Commission (CRITFC), University of Idaho (U of I), Washington State University (WSU), Idaho Department of Fish and Game (IDFG), Oregon Department of Fish and Wildlife (ODFW), Washington Department of Fish and Wildlife (WDFW), National Marine Fisheries Service (NMFS), and the USFWS for analysis. All mortalities will be transferred to: ODFW, IDFG, WDFW, CRITFC, NMFS, USFWS, University of Idaho, and Washington State University as appropriate for lab analysis.
Public Availability of Product/Publications:	DFRM annual reports, metadata, and performance measure data will be available at http://www.nptfisheries.org. Appropriate components of program data and results will also be provided to the following websites: Snake Basin Data Group; Pacific States Marine Fisheries Commission (PSMFC), including: PIT Tag Information System (PTAGIS), the Regional Mark Information System (RMIS); Integrated Status and Effectiveness Monitoring Program (STEM); Fish Passage Center (FPC); StreamNet; and NOAA Northwest Science Center. Information will be provided on performance measures, organized by the VSP categories: abundance, survival-productivity, distribution, genetic, life history, habitat, and in-hatchery measures, enabling the public, managers, policy makers, and researches with reports and data.

Federal Information

Federal Agency	Type	Authorization Number and Title	Date Signed	Expiration Date	Listing Units/Stocks Covered	Comments
Bureau of Indian Affairs (BIA)	Section 10 permit	1134-4M -	06/17/2009	12/31/2012	Chinook Salmon, Snake River fall-run (NMFS Threatened);Chinook Salmon, Snake River spring/summer-run (NMFS Threatened);Steelhead, Snake River Basin (NMFS Threatened)	
Bureau of Indian Affairs (BIA)	Section 10 permit	1339-2R	06/29/2007	12/31/2011	Chinook Salmon, Snake River spring/summer-run (NMFS Threatened);Steelhead, Snake River Basin (NMFS Threatened)	
Bureau of Indian Affairs (BIA)	Other	TE001598-4 Federal Fish and Wildlife Permit	05/28/2009	01/06/2013	N/A	Bull Trout Permit from U.S. Fish and Wildlife Service

National Marine Fisheries Service (NMFS)	Other	Determination of Take BPA Project #199703000	01/20/2011	12/31/2013	Chinook Salmon, Snake River spring/summer-run (NMFS Threatened);Steelhead, Snake River Basin (NMFS Threatened)	This was a letter of determination for this specific project that was done to get a FAST Track steelhead project underway. This application will supersede that letter of determination.

Location/Take Information

Freshwater Location

Research Area: Pacific Ocean **State:** OR **Sub Basin (4th Field HUC):** Imnaha River **Stream Name:** Imnaha River Basin
Sale in Oregon of species taken: None
Location Description: Cow, Lightning, Horse, Big Sheep, Camp, Little Sheep, Freezeout, Grouse, Crazyman, Mahogany, and Gumboot Creeks in Oregon.

Take Information

Line	Ver	Species	Listing Unit/Stock	Production /Origin	Life Stage	Sex	Expected Take	Indirect Mort	Take Action	Observe /Collect Method	Procedure	Run	Transport Record	Begin Date	End Date
1		Salmon, Chinook	Snake River spring/summer-run (NMFS Threatened)	Natural	Adult	Male and Female	100	1	Capture/Handle/Release Fish	Weir (only if associated with fish handling)	Anesthetize	Spring/Summer	N/A	3/26/2012	12/31/2016
2		Steelhead	Snake River Basin (NMFS Threatened)	Natural	Adult	Male and Female	2000	20	Capture/Mark, Tag, Sample Tissue/Release Live Animal	Weir (only if associated with fish handling)	Anesthetize; Punch (opercle, caudal, etc.); Tag, Floy; Tag, PIT; Tissue Sample Fin or Opercle; Tissue Sample Scale	Summer	N/A	3/26/2012	12/31/2016
3		Steelhead	Snake River Basin (NMFS Threatened)	Natural	Adult	Male and Female	2000	20	Capture/Handle/Release Fish	Weir (only if associated with fish handling)	Anesthetize	Summer	N/A	3/26/2012	12/31/2016
4		Steelhead	Snake River Basin (NMFS Threatened)	Natural	Adult	Male and Female	500	0	Observe/Sample Tissue Dead Animal	Weir (only if associated with fish handling)	Tissue sample (other internal tissues); Tissue Sample Fin or Opercle	Summer	N/A	3/26/2012	12/31/2016
5		Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Intact Adipose	Adult	Male and Female	2000	20	Capture/Mark, Tag, Sample Tissue/Release Live Animal	Weir (only if associated with fish handling)	Anesthetize; Punch (opercle, caudal, etc.); Tag, Floy; Tag, PIT; Tissue Sample Fin or Opercle; Tissue Sample Scale	Summer	N/A	3/26/2012	12/31/2016
6		Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Intact Adipose	Adult	Male and Female	2000	20	Capture/Handle/Release Fish	Weir (only if associated with fish handling)	Anesthetize	Summer	N/A	3/26/2012	12/31/2016
7		Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Intact Adipose	Adult	Male and Female	500	0	Observe/Sample Tissue Dead Animal	Weir (only if associated with fish handling)	Tissue sample (other internal tissues); Tissue Sample Fin or Opercle	Summer	N/A	3/26/2012	12/31/2016

8	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	2000	20	Capture/Mark, Tag, Sample Tissue/Release Live Animal	Weir (only if associated with fish handling)	Anesthetize; Punch (opercle, caudal, etc.); Tag, Floy; Tag, PIT; Tissue Sample Fin or Opercle; Tissue Sample Scale	Summer	N/A	3/26/2012	12/31/2016
9	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	2000	20	Capture/Handle/Release Fish	Weir (only if associated with fish handling)	Anesthetize	Summer	N/A	3/26/2012	12/31/2016
10	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	500	0	Observe/Sample Tissue Dead Animal	Weir (only if associated with fish handling)	Tissue sample (other internal tissues); Tissue Sample Fin or Opercle	Summer	N/A	3/26/2012	12/31/2016
11	Salmon, Chinook	Snake River spring/summer-run (NMFS Threatened)	Listed Hatchery Intact Adipose	Adult	Male and Female	100	1	Capture/Handle/Release Fish	Weir (only if associated with fish handling)		Spring/Summer	N/A	3/26/2012	12/31/2016
12	Salmon, Chinook	Snake River spring/summer-run (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	100	1	Capture/Handle/Release Fish	Weir (only if associated with fish handling)		Spring/Summer	N/A	3/26/2012	12/31/2016

Freshwater Location

Research Area: Pacific Ocean **States:** OR,WA **Sub Basin (4th Field HUC):** Lower Grande Ronde **Stream Name:** Grande Ronde River Basin
Sale in Oregon of species taken: None
Location Description: Joseph Creek, Lostine, and Minam, and Wenaha rivers

Take Information

Line Ver	Species	Listing Unit/Stock	Production /Origin	Life Stage	Sex	Expected Take	Indirect Mort	Take Action	Observe /Collect Method	Procedure	Run	Transport Record	Begin Date	End Date
1	Steelhead	Snake River Basin (NMFS Threatened)	Natural	Adult	Male and Female	2000	20	Capture/Mark, Tag, Sample Tissue/Release Live Animal	Weir (only if associated with fish handling)	Punch (opercle, caudal, etc.); Tag, Floy; Tag, PIT; Tissue Sample Fin or Opercle; Tissue Sample Scale	Summer	N/A	3/26/2012	12/31/2016
2	Steelhead	Snake River Basin (NMFS Threatened)	Natural	Adult	Male and Female	2000	20	Capture/Handle/Release Fish	Weir (only if associated with fish handling)	Anesthetize	Summer	N/A	3/26/2012	12/31/2016
3	Steelhead	Snake River Basin (NMFS Threatened)	Natural	Adult	Male and Female	500	0	Observe/Sample Tissue Dead Animal	Weir (only if associated with fish handling)	Tissue sample (other internal tissues); Tissue Sample Fin or Opercle	Summer	N/A	3/26/2012	12/31/2016

4	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	2000	20	Capture/Mark, Tag, Sample Tissue/Release Live Animal	Weir (only if associated with fish handling)	Punch (opercle, caudal, etc.); Tag, Floy; Tag, PIT; Tissue Sample Fin or Opercle; Tissue Sample Scale	Summer	N/A	3/26/2012	12/31/2016
5	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	2000	20	Capture/Handle/Release Fish	Weir (only if associated with fish handling)	Anesthetize	Summer	N/A	3/26/2012	12/31/2016
6	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	500	0	Observe/Sample Tissue Dead Animal	Weir (only if associated with fish handling)	Tissue sample (other internal tissues); Tissue Sample Fin or Opercle	Summer	N/A	3/26/2012	12/31/2016
7	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Intact Adipose	Adult	Male and Female	2000	20	Capture/Mark, Tag, Sample Tissue/Release Live Animal	Weir (only if associated with fish handling)	Punch (opercle, caudal, etc.); Tag, Floy; Tag, PIT; Tissue Sample Fin or Opercle; Tissue Sample Scale	Summer	N/A	3/26/2012	12/31/2016
8	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Intact Adipose	Adult	Male and Female	2000	20	Capture/Handle/Release Fish	Weir (only if associated with fish handling)	Anesthetize	Summer	N/A	3/26/2012	12/31/2016
9	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Intact Adipose	Adult	Male and Female	500	0	Observe/Sample Tissue Dead Animal	Weir (only if associated with fish handling)	Tissue sample (other internal tissues); Tissue Sample Fin or Opercle	Summer	N/A	3/26/2012	12/31/2016
10	Salmon, Chinook	Snake River spring/summer-run (NMFS Threatened)	Natural	Adult	Male and Female	100	1	Capture/Handle/Release Fish	Weir (only if associated with fish handling)	Anesthetize	Spring/Summer	N/A	3/26/2012	12/31/2016
11	Salmon, Chinook	Snake River spring/summer-run (NMFS Threatened)	Listed Hatchery Intact Adipose	Adult	Male and Female	100	1	Capture/Handle/Release Fish	Weir (only if associated with fish handling)	Anesthetize	Spring/Summer	N/A	3/26/2012	12/31/2016
12	Salmon, Chinook	Snake River spring/summer-run (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	100	1	Capture/Handle/Release Fish	Weir (only if associated with fish handling)	Anesthetize	Spring/Summer	N/A	3/26/2012	12/31/2016
13	Steelhead	Snake River Basin (NMFS Threatened)	Natural	Juvenile	Male and Female	20000	200	Capture/Mark, Tag, Sample Tissue/Release Live Animal	Trap, Screw	Anesthetize; Finclip - mark; Paint, Stain or Dye Immersion; Tag, PIT; Tissue Sample Fin or Opercle; Tissue Sample Scale	Summer	N/A	3/26/2012	12/31/2016

14	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Intact Adipose	Juvenile	Male and Female	20000	200	Capture/Mark, Tag, Sample Tissue/Release Live Animal	Trap, Screw	Anesthetize; Finclip - mark; Paint, Stain or Dye Immersion; Tissue Sample Fin or Opercle; Tissue Sample Scale	Summer	N/A	3/26/2012	12/31/2016
15	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Adipose Clip	Juvenile	Male and Female	20000	200	Capture/Mark, Tag, Sample Tissue/Release Live Animal	Trap, Screw	Anesthetize; Finclip - mark; Paint, Stain or Dye Immersion; Tissue Sample Fin or Opercle; Tissue Sample Scale	Summer	N/A	3/26/2012	12/31/2016
16	Salmon, Chinook	Snake River spring/summer-run (NMFS Threatened)	Natural	Juvenile	Male and Female	20000	200	Capture/Mark, Tag, Sample Tissue/Release Live Animal	Trap, Screw	Anesthetize; Finclip - mark; Paint, Stain or Dye Immersion; Tag, PIT; Tissue Sample Fin or Opercle; Tissue Sample Scale	Spring/Summer	N/A	3/26/2012	12/31/2016
17	Salmon, Chinook	Snake River spring/summer-run (NMFS Threatened)	Listed Hatchery Intact Adipose	Juvenile	Male and Female	20000	200	Capture/Mark, Tag, Sample Tissue/Release Live Animal	Trap, Screw	Anesthetize; Finclip - mark; Paint, Stain or Dye Immersion; Tissue Sample Fin or Opercle; Tissue Sample Scale	Spring/Summer	N/A	3/26/2012	12/31/2016
18	Salmon, Chinook	Snake River spring/summer-run (NMFS Threatened)	Listed Hatchery Adipose Clip	Juvenile	Male and Female	20000	200	Capture/Mark, Tag, Sample Tissue/Release Live Animal	Trap, Screw	Anesthetize; Finclip - mark; Paint, Stain or Dye Immersion; Tissue Sample Fin or Opercle; Tissue Sample Scale	Spring/Summer	N/A	3/26/2012	12/31/2016
20	Steelhead	Snake River Basin (NMFS Threatened)	Natural	Adult	Male and Female	100	1	Observe/Harass	Trap, Screw		Summer	N/A	3/26/2012	12/31/2016
21	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Intact Adipose	Adult	Male and Female	100	1	Observe/Harass	Trap, Screw		Summer	N/A	3/26/2012	12/31/2016
22	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	100	1	Observe/Harass	Trap, Screw		Summer	N/A	3/26/2012	12/31/2016
23	Salmon, Chinook	Snake River spring/summer-run (NMFS Threatened)	Natural	Adult	Male and Female	100	1	Observe/Harass	Trap, Screw		Spring/Summer	N/A	3/26/2012	12/31/2016
24	Salmon, Chinook	Snake River spring/summer-run (NMFS Threatened)	Listed Hatchery Intact Adipose	Adult	Male and Female	100	1	Observe/Harass	Trap, Screw		Spring/Summer	N/A	3/26/2012	12/31/2016

25	Salmon, Chinook	Snake River spring/summer-run (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	100	1	Observe/Harass	Trap, Screw		Spring/Summer	N/A	3/26/2012	12/31/2016
26	Steelhead	Snake River Basin (NMFS Threatened)	Natural	Juvenile	Male and Female	20000	200	Capture/Handle/Release Fish	Trap, Screw	Anesthetize	Summer	N/A	3/26/2012	12/31/2016
27	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Intact Adipose	Juvenile	Male and Female	20000	200	Capture/Handle/Release Fish	Trap, Screw	Anesthetize	Summer	N/A	3/26/2012	12/31/2016
28	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Adipose Clip	Juvenile	Male and Female	20000	200	Capture/Handle/Release Fish	Trap, Screw	Anesthetize	Summer	N/A	3/26/2012	12/31/2016
29	Salmon, Chinook	Snake River spring/summer-run (NMFS Threatened)	Natural	Juvenile	Male and Female	20000	200	Capture/Handle/Release Fish	Trap, Screw	Anesthetize	Spring/Summer	N/A	3/26/2012	12/31/2016
30	Salmon, Chinook	Snake River spring/summer-run (NMFS Threatened)	Listed Hatchery Intact Adipose	Juvenile	Male and Female	20000	200	Capture/Handle/Release Fish	Trap, Screw	Anesthetize	Spring/Summer	N/A	3/26/2012	12/31/2016
31	Salmon, Chinook	Snake River spring/summer-run (NMFS Threatened)	Listed Hatchery Adipose Clip	Juvenile	Male and Female	20000	200	Capture/Handle/Release Fish	Trap, Screw	Anesthetize	Spring/Summer	N/A	3/26/2012	12/31/2016

Freshwater Location

Research Area: Pacific Ocean **State:** ID **Sub Basin (4th Field HUC):** Clearwater **Stream Name:** Clearwater River Basin
Sale in Oregon of species taken: None
Location Description: South Fork Clearwater and Lolo Creek

Take Information

Line Ver	Species	Listing Unit/Stock	Production /Origin	Life Stage	Sex	Expected Take	Indirect Mort	Take Action	Observe /Collect Method	Procedure	Run	Transport Record	Begin Date	End Date
1	Steelhead	Snake River Basin (NMFS Threatened)	Natural	Adult	Male and Female	750	8	Capture/Mark, Tag, Sample Tissue/Release Live Animal	Weir (only if associated with fish handling)	Anesthetize; Finclip - mark; Punch (opercle, caudal, etc.); Tag, Floy; Tag, PIT; Tissue Sample Fin or Opercle; Tissue Sample Scale	Summer	N/A	3/26/2012	12/31/2016
2	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Intact Adipose	Adult	Male and Female	750	8	Capture/Mark, Tag, Sample Tissue/Release Live Animal	Weir (only if associated with fish handling)	Anesthetize; Finclip - mark; Punch (opercle, caudal, etc.); Tag, Floy; Tag, PIT; Tissue Sample Fin or Opercle; Tissue Sample Scale	Summer	N/A	3/26/2012	12/31/2016

3	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	750	8	Capture/Mark, Tag, Sample Tissue/Release Live Animal	Weir (only if associated with fish handling)	Anesthetize; Finclip - mark; Punch (opercle, caudal, etc.); Tag, Floy; Tag, PIT; Tissue Sample Fin or Opercle; Tissue Sample Scale	Summer	N/A	3/26/2012	12/31/2016
4	Steelhead	Snake River Basin (NMFS Threatened)	Natural	Adult	Male and Female	750	8	Capture/Handle/Release Fish	Weir (only if associated with fish handling)	Anesthetize	Summer	N/A	3/26/2012	12/31/2016
5	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Intact Adipose	Adult	Male and Female	750	8	Capture/Handle/Release Fish	Weir (only if associated with fish handling)	Anesthetize	Summer	N/A	3/26/2012	12/31/2016
6	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	750	8	Capture/Handle/Release Fish	Weir (only if associated with fish handling)	Anesthetize	Summer	N/A	3/26/2012	12/31/2016
7	Salmon, Chinook	Snake River fall-run (NMFS Threatened)	Natural	Adult	Male and Female	100	1	Capture/Handle/Release Fish	Weir (only if associated with fish handling)	Anesthetize	Fall	N/A	3/26/2012	12/31/2016
8	Salmon, Chinook	Snake River fall-run (NMFS Threatened)	Listed Hatchery Intact Adipose	Adult	Male and Female	100	1	Capture/Handle/Release Fish	Weir (only if associated with fish handling)	Anesthetize	Fall	N/A	3/26/2012	12/31/2016
9	Salmon, Chinook	Snake River fall-run (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	100	1	Capture/Handle/Release Fish	Weir (only if associated with fish handling)	Anesthetize	Fall	N/A	3/26/2012	12/31/2016
10	Steelhead	Snake River Basin (NMFS Threatened)	Natural	Adult	Male and Female	500	0	Observe/Sample Tissue Dead Animal	Weir (only if associated with fish handling)	Tissue Sample Fin or Opercle; Tissue Sample Scale	Summer	N/A	3/26/2012	12/31/2016
11	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Intact Adipose	Adult	Male and Female	500	0	Observe/Sample Tissue Dead Animal	Weir (only if associated with fish handling)	Tissue Sample Fin or Opercle; Tissue Sample Scale	Summer	N/A	3/26/2012	12/31/2016
12	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	500	0	Observe/Sample Tissue Dead Animal	Weir (only if associated with fish handling)	Tissue Sample Fin or Opercle; Tissue Sample Scale	Summer	N/A	3/26/2012	12/31/2016
13	Steelhead	Snake River Basin (NMFS Threatened)	Natural	Adult	Male and Female	100	1	Capture/Handle/Release Fish	Trap, Screw	Anesthetize	Summer	N/A	3/26/2012	12/31/2016
14	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Intact Adipose	Adult	Male and Female	100	1	Capture/Handle/Release Fish	Trap, Screw	Anesthetize	Summer	N/A	3/26/2012	12/31/2016
15	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	100	1	Capture/Handle/Release Fish	Trap, Screw	Anesthetize	Summer	N/A	3/26/2012	12/31/2016

16	Steelhead	Snake River Basin (NMFS Threatened)	Natural	Juvenile	Male and Female	20000	200	Capture/Mark, Tag, Sample Tissue/Release Live Animal	Trap, Screw	Anesthetize; Finclip - mark; Paint, Stain or Dye Immersion; Tag, PIT; Tissue Sample Fin or Opercle; Tissue Sample Scale	Summer	N/A	3/26/2012	12/31/2016
17	Steelhead	Snake River Basin (NMFS Threatened)	Natural	Juvenile	Male and Female	20000	200	Capture/Handle/Release Fish	Trap, Screw	Anesthetize	Summer	N/A	3/26/2012	12/31/2016
18	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Intact Adipose	Juvenile	Male and Female	500	5	Capture/Mark, Tag, Sample Tissue/Release Live Animal	Trap, Screw	Anesthetize; Paint, Stain or Dye Immersion; Tag, PIT; Tissue Sample Fin or Opercle; Tissue Sample Scale	Summer	N/A	3/26/2012	12/31/2016
19	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Intact Adipose	Juvenile	Male and Female	20000	200	Capture/Handle/Release Fish	Trap, Screw	Anesthetize	Summer	N/A	3/26/2012	12/31/2016
20	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Adipose Clip	Juvenile	Male and Female	500	5	Capture/Mark, Tag, Sample Tissue/Release Live Animal	Trap, Screw	Anesthetize; Paint, Stain or Dye Immersion; Tag, PIT; Tissue Sample Fin or Opercle; Tissue Sample Scale	Summer	N/A	3/26/2012	12/31/2016
21	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Adipose Clip	Juvenile	Male and Female	20000	200	Capture/Handle/Release Fish	Trap, Screw	Anesthetize	Summer	N/A	3/26/2012	12/31/2016
22	Salmon, Chinook	Snake River fall-run (NMFS Threatened)	Natural	Adult	Male and Female	100	1	Capture/Handle/Release Fish	Trap, Screw	Anesthetize	Fall	N/A	3/26/2012	12/31/2016
23	Salmon, Chinook	Snake River fall-run (NMFS Threatened)	Listed Hatchery Intact Adipose	Adult	Male and Female	100	1	Capture/Handle/Release Fish	Trap, Screw	Anesthetize	Fall	N/A	3/26/2012	12/31/2016
24	Salmon, Chinook	Snake River fall-run (NMFS Threatened)	Listed Hatchery Adipose Clip	Adult	Male and Female	100	1	Capture/Handle/Release Fish	Trap, Screw	Anesthetize	Fall	N/A	3/26/2012	12/31/2016

Freshwater Location

Research Area: Pacific Ocean **State:** WA **Sub Basin (4th Field HUC):** Lower Snake River **Stream Name:** Lower Granite Dam Adult Trap
Sale in Oregon of species taken: None
Location Description: Lower Granite Dam Adult Trap

Take Information

Line Ver	Species	Listing Unit/Stock	Production /Origin	Life Stage	Sex	Expected Take	Indirect Mort	Take Action	Observe /Collect Method	Procedure	Run	Transport Record	Begin Date	End Date
1	Steelhead	Snake River Basin (NMFS Threatened)	Natural	Adult	Male and Female	50	5	Capture/Mark, Tag, Sample Tissue/Release Live Animal	Fish Ladder (only if associated with fish handling)	Anesthetize; Punch (opercle, caudal, etc.); Tag, Radio (Internal); Tissue Sample Fin or Opercle; Tissue Sample Scale	Summer	N/A	3/26/2012	12/31/2016

2	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Adult Adipose Clip	Male and Female	50	5	Capture/Mark, Tag, Sample Tissue/Release Live Animal	Fish Ladder (only if associated with fish handling)	Anesthetize; Punch (opercle, caudal, etc.); Tag, Radio (Internal); Tissue Sample Fin or Opercle; Tissue Sample Scale	Summer	N/A	3/26/2012	12/31/2016
3	Steelhead	Snake River Basin (NMFS Threatened)	Listed Hatchery Adult Intact Adipose	Male and Female	50	5	Capture/Mark, Tag, Sample Tissue/Release Live Animal	Fish Ladder (only if associated with fish handling)	Anesthetize; Punch (opercle, caudal, etc.); Tag, Radio (Internal); Tissue Sample Fin or Opercle; Tissue Sample Scale	Summer	N/A	3/26/2012	12/31/2016

NEPA Checklist

1) If your activities will involve equipment (e.g., scientific instruments) or techniques that are new, untested,or otherwise have unknown or uncertain impacts on the biological or physical environment , please discuss the degree to which they are likely to be adopted by others for similar activities or applied more broadly.

These projects are funded by the Bonneville Power Administration (BPA), they (BPA) are required to preform NEPA analysis on all of their funded projects. After completing the NEPA analysis for the projects addressed in this ESA Section 10 Permit application BPA made a determiniation that these projects meet the determiniation for a NEPA Categorical Exclusion.

Any questions or concerns should be addressed to:
Brenda Aguirre
Bonneville Power Administration
Environmental Protection Specialist
(503) 230-5928

2) If your activities involve collecting, handling, or transporting potentially infectious agents or pathogens (e.g., biological specimens such as live animals or blood), or using or transporting hazardous substances (e.g., toxic chemicals), provide a description of the protocols you will use to ensure public health and human safety are not adversely affected, such as by spread of zoonotic diseases or contamination of food or water supplies.

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Brenda Aguirre
Bonneville Power Administration
Environmental Protection Specialist
(503) 230-5928

3) Describe the physical characteristics of your project location, including whether you will be working in or near unique geographic areas such as state or National Marine Sanctuaries, Marine Protected Areas, Parks or Wilderness Areas, Wildlife Refuges, Wild and Scenic Rivers, designated Critical Habitat for endangered or threatened species, Essential Fish Habitat, etc. Discuss how your activities could impact the physical environment, such as by direct alteration of substrate during use of bottom trawls, setting nets, anchoring vessels or buoys, erecting blinds or other structures, or ingress and egress of researchers, and measures you will take to minimize these impacts.

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Bonneville Power Administration
Environmental Protection Specialist
(503) 230-5928

4) Briefly describe important scientific, cultural, or historic resources (e.g., archeological resources, animals used for subsistence, sites listed in or eligible for listing in the National Register of Historic Places) in your project area and discuss measures you will take to ensure your work does not cause loss or destruction of such resources. If your activity will target marine mammals in Alaska or Washington, discuss measures you will take to ensure your project does not adversely affect the availability (e.g., distribution, abundance) or suitability (e.g., food safety) of these animals for subsistence uses.

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Bonneville Power Administration
Environmental Protection Specialist
(503) 230-5928

5) Discuss whether your project involves activities known or suspected of introducing or spreading invasive species, intentionally or not, (e.g., transporting animals or tissues, discharging ballast water, use of equipment at multiple sites). Describe measures you would take to prevent the possible introduction or spread of non-indigenous or invasive species, including plants, animals, microbes, or other biological agents.

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Bonneville Power Administration
Environmental Protection Specialist
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Project Contacts

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Principal Investigator: Jay Hesse

Other Personnel:

Name	Role(s)
Cameron Albee	Co-Investigator
Catherine Bradley	Co-Investigator
Justin Bretz	Co-Investigator
Michael Busby	Co-Investigator
Neal Espinosa	Co-Investigator
Jim Harbeck	Co-Investigator
Jocelyn Hatch	Co-Investigator
Paul Kucera	Co-Investigator
Sherman Sprague	Co-Investigator

Jason L. Vogel Co-Investigator
Bill Young Co-Investigator

Attachments

Federal Authorization - P15556T21339 most recent.pdf (Added Sep 16, 2010)
Federal Authorization - P15556T2Nez Perce Tribe #TE001598-3 Bull Trout Permit 2009-2013.pdf (Added Sep 16, 2010)
Federal Authorization - P15556T2Nez Perce Tribe ESA Permit #1134 2008-2012 Updated July 2009.pdf (Added Sep 16, 2010)
Project Description - P15556T1201003200n NPT Imnaha Steelhead.pdf (Added Sep 16, 2010)
Project Description - P15556T1201003200n NPT Joseph Creek.pdf (Added Sep 16, 2010)
Project Description - P15556T1Proposal RMECAT-00177 - B-run Steelhead Supplementation Monitoring Project.pdf (Added Sep 16, 2010)
References - P15556T12ESA 1339 Modification References.docx (Added Sep 17, 2010)

Status

Application Status: Application Complete
Date Submitted: September 23, 2011
Date Completed: September 30, 2011
FR Notice of Receipt Published: November 17, 2011 **Number:** 2011-71315
Comment Period Closed: December 19, 2011 **Comments Received:** No **Comments Addressed:** No
Last Date Archived: May 22, 2012

- **ESA Section 10(a)(1)(A) permit (Pacific fish)**

Current Status: Issued **Status Date:** March 26, 2012
Section 7 Consultation: Formal Consultation
NEPA Analysis: Categorical Exclusion
Expire Date: December 31, 2016
Analyst Information:

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Modification Requests

Reports